

A NEW SPECIES OF *BRADYIDIUS* (COPEPODA, CALANOIDA)
FROM THE MGAZANA ESTUARY, PONDOLAND, SOUTH AFRICA,
AND A REVIEW OF THE CLOSELY RELATED GENUS
PSEUDOTHARYBIS

By

JANET M. BRADFORD

*New Zealand Oceanographic Institute, Department of Scientific
and Industrial Research, Wellington*

(With 5 figures and 1 table)

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ABSTRACT

A new species, *Bradyidius hirsutus*, is described. Four species previously attributed to *Bradyidius* are transferred to *Pseudotharybis* which is placed in the Aetideidae.

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INTRODUCTION

The nine previously known species of the aetideid genus *Bradyidius* are *B. angustus* (Tanaka, 1957), *B. arnoldi* Fleminger, 1957, *B. bradyi* (Sars, 1902) (see Matthews (1964) for discussion of priority of specific name *bradyi* over *armatus*), *B. luluae* Grice, 1972, *B. pacificus* (Brodsky, 1950), *B. saanichi* Park, 1960, *B. similis* (Sars, 1902), *B. spinifer* Bradford, 1969a, and *B. tropicus* Wolfenden, 1905. Both sexes are known except for *B. angustus* described only from the male, and *B. tropicus* described only from the female and which has not been morphologically distinguished from *B. bradyi* except that it is smaller and has fewer, coarser teeth on the terminal exopod spine of legs 2-4 (Wolfenden 1905: 1006). At the end of this paper four species, previously attributed to *Bradyidius*, are removed to another genus.

The new species of *Bradyidius* described below was found in plankton samples from the Mغازana Estuary, Pondoland, South Africa (31° 50' S). Although *Bradyidius* is known to be a benthic genus these particular specimens were taken by T. Wooldridge on 1 September 1972 at night just below the surface on an incoming tide at the mouth of the Mغازana Estuary. The depth at this locality is about 3 metres at low tide, salinity 35,0‰ (measured by hydrometer) and temperature 17,8°C.

Dissected specimens of the presently described new species of *Bradyidius* were mounted unstained in Euparal and observed using phase contrast. Descriptions have been made from paratype material.

DESCRIPTION OF MATERIAL

Bradyidius hirsutus sp. nov.

(Figs 1–5)

Holotype

SAM-A13661 in the South African Museum, Cape Town. Adult female in plankton sample from mouth of Mgazana Lagoon, collected by T. Wooldridge, 1 September 1972.

Paratypes

SAM-A13662 in the South African Museum, Cape Town; 1 male whole, 2 males and 2 females dissected, collection data as above.

BM(NH)1975.1124 (1 female), BM(NH)1975.1125 (1 male) in the British Museum (Natural History), London; collection data as above.

P295 in the New Zealand Oceanographic Institute, Wellington, collection; 1 female and 1 male, collection data as above.

Description

Female: Holotype 1.61 mm, paratype specimens 1.59–1.68 mm.

Head and pedigerous segment 1 separate, pedigerous segments 4 and 5 fused. Rostrum bifurcate with slightly divergent points. Posterior metasomal points extend not quite to posterior border of genital segment.

Antenna 1 does not extend quite to posterior metasomal points, of 24 joints, each with annulate setae, joints 8 and 9 fused, joints 18–25 bear very long annulate setae as typical for the genus.

Antenna 2. Endopod joint 1 with 1 seta, joint 2 with 7 outer setae, 7 inner setae (1 small); exopod joint 1 with 1 small seta and joint 2 with 3 setae.

Mandible. Basipod 2 with 1 seta; endopod joint 1 with 1 large and 2 small setae, joint 2 with 10 setae, 1 of them small.

Maxilla 1. Inner lobe 1 with 14 spines and setae, inner lobe 2 with 5 setae, inner lobe 3 and 4 setae, basipod 2 with 5 setae, endopod with at least 13 setae, exopod with 10 setae, outer lobe 1 with 9 setae and outer lobe 2 naked.

Maxilla 2. Lobes 1–5 each with 3 spine-like setae, lobe 5 with 1 of these spines very thick and heavy. Terminal part of limb with 7 setae.

Maxilliped as in other *Bradyidius*.

Leg 1. Basipod 1 with outer edge patch of spines, outer edge spines of exopod joints 1 and 2 not extending beyond base of spine on next joint, outer edge spine on exopod joint 3 longer than its joint.

Leg 2. Basipod 1 with outer edge patch of spines; anterior surface of endopod naked, posterior surface of endopod joint 2 with small hairs covering about half area. Terminal exopod spine with 17 or 21 teeth.

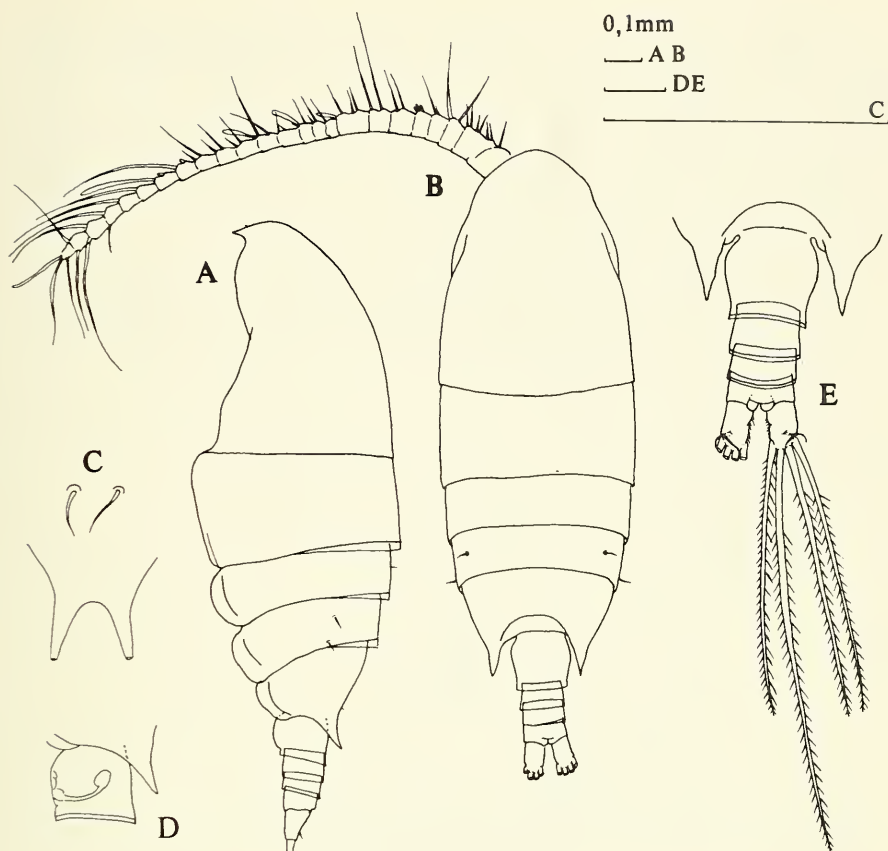


Fig. 1. *Bradyidius hirsutus* sp. nov. Female.

A. Lateral view. B. Dorsal view. C. Rostrum. D. Genital segment, lateral view. E. Urosome, dorsal view.

Leg 3. Basipod 1 with outer edge patch of spines; anterior surface of endopod joints 2 and 3 with small hairs covering slightly smaller area than spines on posterior surface. Terminal exopod spine with 18 or 19 teeth.

Leg 4. Posterior surface of endopod joints 2 and 3 also anterior surface of endopod joint 3 with small hairs. Terminal exopod spine with 20–23 teeth.

Leg 5 absent.

Male: Paratypes 1,36–1,53 mm.

Head and pedigerous segment 1 also pedigerous segments 4 and 5 completely fused. Rostrum bifurcate with slightly diverging points. Posterior metasomal points extend as far as posterior border of urosome segment 1.

Antenna 1 does not extend beyond posterior metasomal points; of 21 or 22 joints, most with annulate setae, 8–10, 12–13 fused as are 20–21 on right side; joints 1–12 with large aesthetes.

Antenna 2 similar to that of female except basipod 1 with row of conspicuous hairs, exopod joint 1 without setae, endopod joint 2 with 2 setae; endopod joint 2 with 6 outer setae.

Mandible blade without teeth, basipod apparently without seta, endopod joint 2 with 10 setae.

Maxilla 1 inner lobes 1-3 without spines or setae, endopod with a few rudimentary setae, exopod and outer lobe 1 with setae.

Maxilla 2 reduced to small lobe without setae.

Maxilliped similar to that of female except basipod 1 has 2 setae distally.

Legs 1-4 similar to those of female except outer edge exopod spines smaller. Terminal spine of legs 2-4 with 20-23, 20-22, and 24-26 teeth respectively.

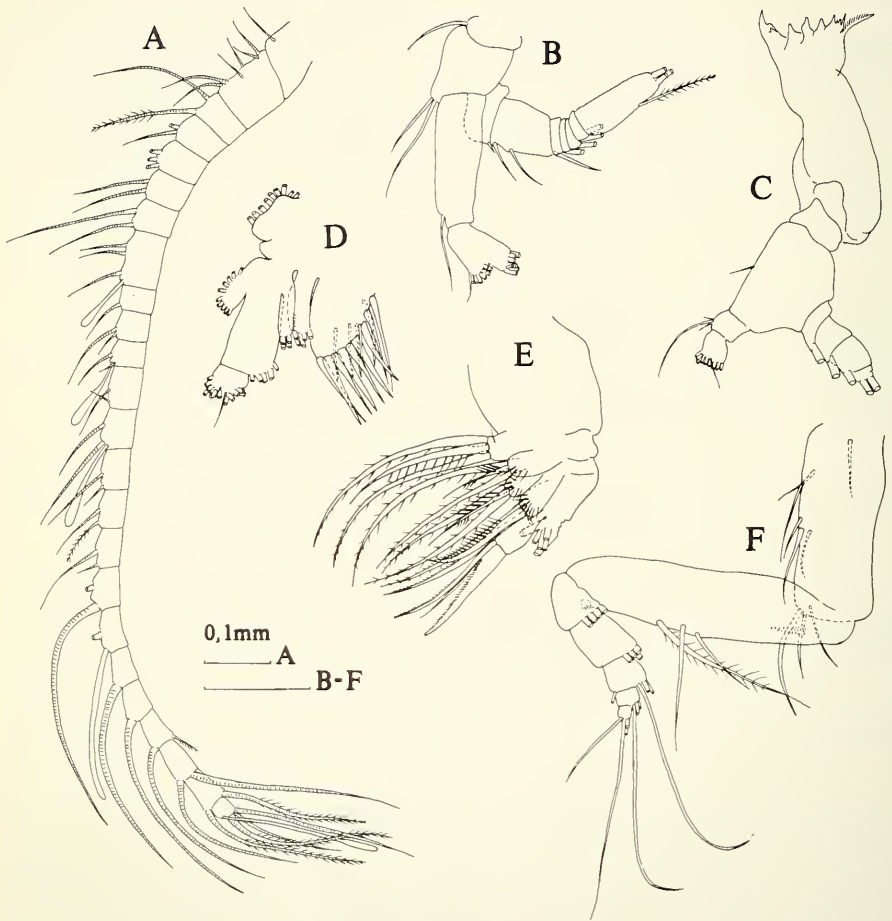


Fig. 2. *Bradyidius nrsutus* sp. nov. Female.

A. Antenna 1. B. Antenna 2. C. Mandible. D. Maxilla 1. E. Maxilla 2. F. Maxilliped.

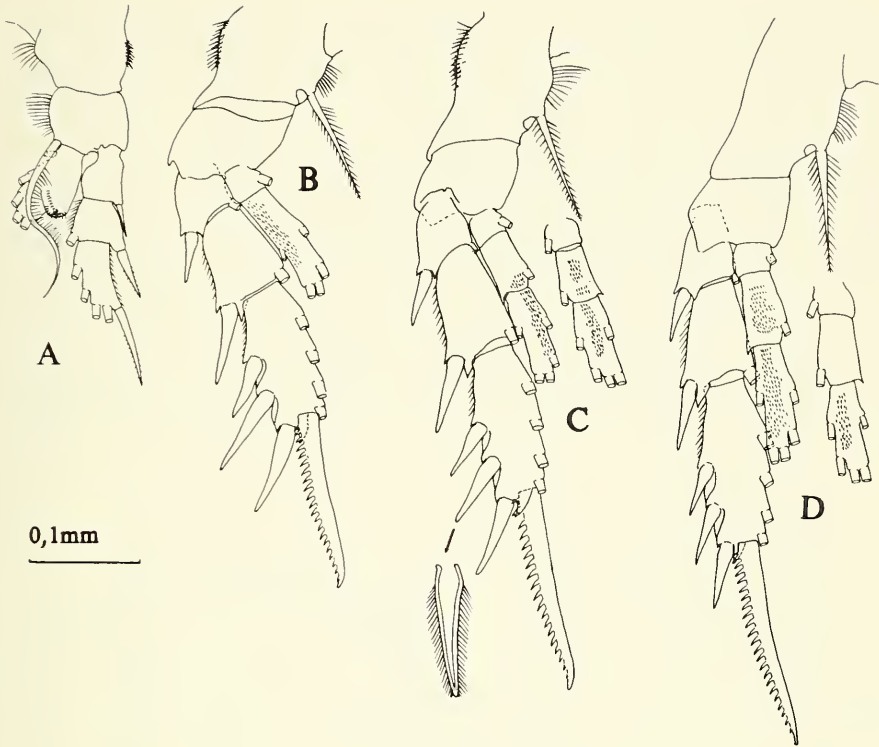


Fig. 3. *Bradyidius hirsutus* sp. nov. Female.

A. Leg 1, anterior view. B. Leg 2, posterior view. C. Leg 3, anterior view and posterior view of endopod. D. Leg 4, posterior view and anterior view of endopod.

Leg 5 uniramous on each side, hardly extending beyond caudal rami, right leg styliform, of 4 joints; left leg of 5 joints, penultimate joint with inner distal knob bearing a fine spinule, terminal joint with row of small spinules.

Etymology

From the Latin *hirsutus* = hairy, referring to the fact that hairs are to be found on both the anterior and posterior surfaces of legs 3 and 4.

Discussion

All the species of *Bradyidius* are compared in Table 1 in so far as they are known.

Female *Bradyidius hirsutus* may be distinguished primarily from *B. arnoldi*, *B. saanichi* and *B. spinifer*, the three species it most resembles in respect to the length of the posterior metasomal points in that the anterior surfaces of legs 3 and 4 as well as posterior endopod surfaces of legs 2–4 are ornamented with many small hairs. Also the rostral points of *B. hirsutus* are slightly divergent but in *B. arnoldi* not divergent and in *B. saanichi* strongly divergent (exact shape not

TABLE 1
Comparison of species of *Bradyidius*

| Species | Length (mm) | FEMALE | | | FEMALE + MALE | | MALE | |
|-----------------------------|----------------------------|--|--|--|--------------------|---|------|--|
| | | Extent of posterior metasomal processes | P_1 outer edge spine of Re_1 | Anterior-posterior surface spines $Ri P_{2-4}$ | Rostrum | P_5 | | |
| <i>B. angustus</i> | ♀ unknown ♂ 1,37 | — | — | Posterior | Hardly divergent | Uniramous: distal border right Re_2 extends just beyond distal border left B_2 | | |
| <i>B. arnoldi</i> | ♀ 1,64 ♂ 1,19-1,23 | Almost to posterior border genital segment | Very small | Posterior | Not divergent | Biramous | | |
| <i>B. bradyi</i> | ♀ 2,65 ♂ 2,20 | Posterior border genital segment | Reaches base next spine | Posterior | Slightly divergent | Uniramous: right leg much shorter than left | | |
| <i>B. huluac</i> | ♀ 3,12 ♂ 3,00-3,25 | Just beyond posterior border genital segment | Extends half way along next spine | Posterior (♂) | Strongly divergent | Uniramous: distal border right Re_2 extends to middle left Re_1 | | |
| <i>B. pacificus</i> | ♀ 4,4 ♂ 3,3 | Terminal one-third genital segment | Reaches base next spine | None | Not divergent | Biramous | | |
| <i>B. saanichti</i> | ♀ 2,33-2,56 ♂ 2,01-2,24 | Almost to posterior border genital segment | Reaches base next spine | None | Strongly divergent | Biramous | | |
| <i>B. similis</i> | ♀ 3,0 ♂ 2,4 | Hardly beyond middle genital segment | As in <i>B. bradyi</i> | None | — | Biramous | | |
| <i>B. spinifer</i> | ♀ 2,74 ♂ 1,96 | Almost to posterior border genital segment | Extends over half way along next spine | Posterior | — | Uniramous: distal border right Re_2 extends to middle left Re_1 | | |
| <i>B. tropicus</i> | ♀ 1,2 ♂ unknown | — | — | — | — | — | | |
| <i>B. hirsutus</i> sp. nov. | ♀ 1,59-1,68 ♂ 1,36-1,53 | Almost to posterior border genital segment | Does not reach base next spine | Posterior and anterior | Slightly divergent | Uniramous: distal border right Re_2 extends just beyond distal border left B_2 | | |

— information not known; $Re_{1,2}$ = exopod joint 1, 2; P_{1-5} = legs 1-5; Ri = endopod; B_2 = basipod 2.

known for *B. spinifer*) and the outer edge spine of leg 1 exopod joint 1 does not reach the base of the next spine in *B. hirsutus*, is very small in *B. arnoldi*, reaches the base of the next spine in *B. saanichi* and extends half-way along the next spine in *B. spinifer*.

The male of *B. hirsutus* is most like that of *B. angustus* even to the proportions of leg 5 but differs from it chiefly in the ornamentation on the anterior and posterior surfaces of legs 3 and 4. Also exopod joint 1 of antenna 2 has no setae in *B. hirsutus* whereas it appears to have a seta in Tanaka's (1957) illustration and the rostrum of *B. hirsutus* has a much wider notch at the base of the points than in *B. angustus*.

It appears the setation of the female maxilla 1 may be conservative. Re-examination of the holotype of *B. spinifer* revealed that the basipod 2 in fact has 5 setae, not 4 as described by Bradford (1969a) so *B. spinifer* does not differ from *B. lulae* in this respect.

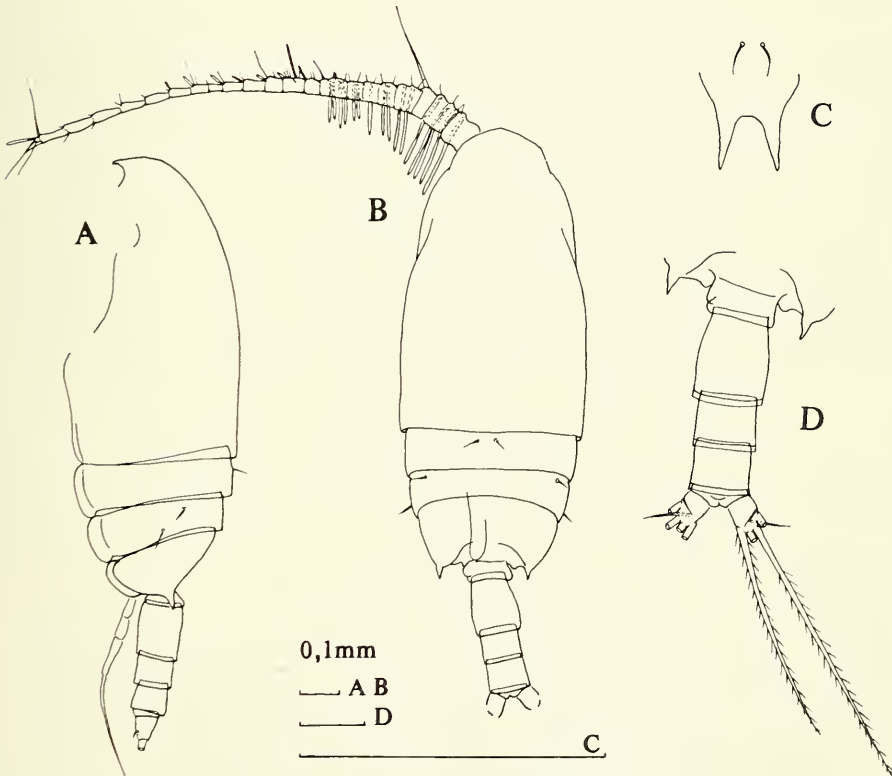


Fig. 4. *Bradyidius hirsutus* sp. nov. Male.

A. Lateral view. B. Dorsal view. C. Rostrum. D. Urosome, dorsal view.

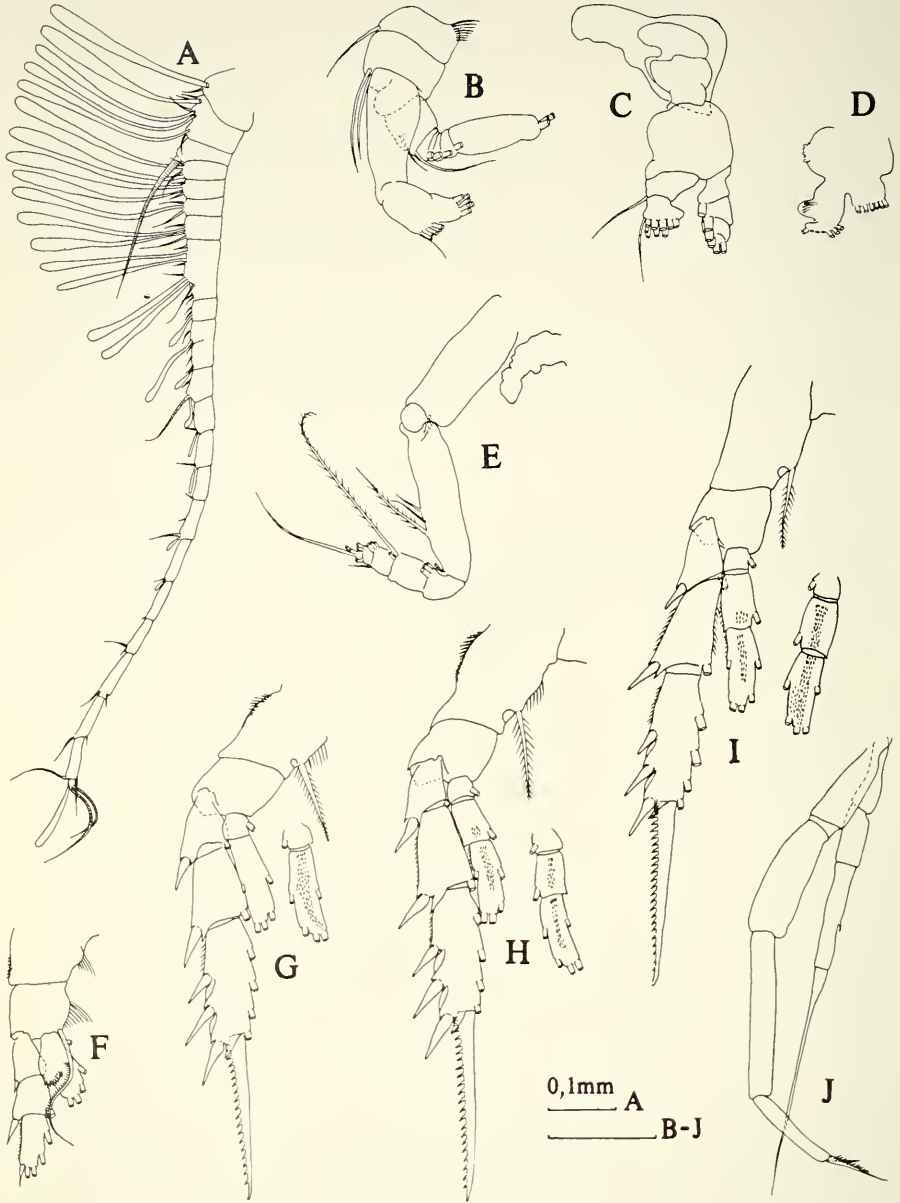


Fig. 5. *Bradyidius hirsutus* sp. nov. Male.

A. Left antenna 1. B. Antenna 2. C. Mandible. D. Maxilla 1. E. Maxilliped and rudimentary maxilla 2. F. Leg 1, anterior view. G. Leg 2, anterior view and posterior view of endopod. H. Leg 3, anterior view and posterior view of endopod. I. Leg 4, anterior view and posterior view of endopod. J. Leg 5.

REVIEW OF *PSEUDOTHARYBIS*

Females of three species attributed to *Bradyidius* by Bradford (1969*b*), *B. robustus*, *B. brevispinus* and a stage V *B. spinibasis* (erroneously referred to as *B. spinatus* in the text (Bradford 1969*a*: 484)) have subsequently been recognized by the author as fitting T. Scott's (1909*a*) brief description of *Pseudotharybis* because of the unique form of the female fifth legs which hardly varies from one species to another. Although T. Scott (1909*a*) implied *Pseudotharybis* was a tharybid, lack of sensory appendages terminally on maxilla 2 precluded that conclusion. This genus is here placed in the family Aetideidae, closely related to *Bradyidius* and *Aetideopsis*, and is one of the few genera in the family to have a female fifth leg.

The male of *B. robustus* Bradford, 1969*a* along with *B. dentatus* Bradford, 1969*a* indicates the form of male *Pseudotharybis* which hardly differs from that of *Bradyidius* or *Aetideopsis* except that the posterior metasomal points are represented in *Pseudotharybis* by a small posterodorsal tooth and in the other two genera by a posterior spine. Thus the genus *Pseudotharybis* now contains the following species: *P. zetlandicus* T. Scott, 1909*a*, *P. brevispinus* (Bradford, 1969*a*), *P. dentatus* (Bradford, 1969*a*), *P. robustus* (Bradford, 1969*a*), and *P. spinibasis* (Bradford, 1969*a*). There is also a possibility that *Aetideopsis magna* Grice & Hulsemann, 1970 belongs to this genus. Pending a closer examination of the genera *Aetideopsis*, *Bradyidius* and *Pseudotharybis* the exact limits of each genus, especially with reference to the males, remains uncertain.

T. Scott's (1909*b*) *P. dubius* must be removed from *Pseudotharybis* as there appear to be important differences from all other species in the genus. For example maxilla I inner and outer lobe 1 are well developed but the remaining parts are reduced in size and have a smaller number of setae, maxilliped basipod I has a strong spiniform seta on its distal border and leg 5 is of a different shape.

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REFERENCES

- BRADFORD, J. M. 1969*a*. New species of *Aetideopsis* Sars and *Bradyidius* Giesbrecht (Copepoda: Calanoida) from the Southern Hemisphere. —*N.Z. Jl mar. freshw. Res.* 3: 73–97.
- BRADFORD, J. M. 1969*b*. New genera and species of benthic calanoid copepods from the New Zealand slope. *N.Z. Jl mar. freshw. Res.* 3: 473–505.
- BRODSKY, K. A. 1950. Calanoida of the far eastern seas and polar basin of the U.S.S.R.—*Opred. Faune SSSR* 35: 1–442. (Translation: Israel Program for Scientific Translation, Jerusalem, 1967).
- FLEMINGER, A. 1957. New calanoid copepods of the families Aetideidae, Euchaetidae, and Stephidae from the Gulf of Mexico.—*Fishery Bull. Fish Wildl. Serv. U.S.* 57: 355–63.
- GRICE, G. D. 1972. The existence of a bottom-living calanoid copepod fauna in deep water with descriptions of five new species.—*Crustaceana* 23: 219–42.

- GRICE, G. D. & HULSEMANN, K. 1970. New species of bottom-living calanoid copepods collected in deep water by the DSRV Alvin.—*Bull. Mus. comp. Zool. Harv.* **139**: 185–227.
- MATTHEWS, J. B. L. 1964. On the biology of some bottom-living copepods (Aetideidae and Phaennidae) from western Norway.—*Sarsia* **16**: 1–46.
- PARK, T. 1960. A new species of *Bradyidius* (Copepoda: Calanoida) from the Pacific coast of North America.—*J. Fish Res. Bd Canada* **23**: 805–11.
- SARS, G. O. 1902, 1903. Copepoda. In: *An account of the Crustacea of Norway* **4**. Bergen: Bergen Museum.
- SCOTT, T. 1909a. On some new and rare Entomostraca from the Scottish Seas.—*Ann. Mag. nat. Hist.* (8) **3**: 122–30.
- SCOTT, T. 1909b. On new and rare Crustacea from Scottish waters.—*Ann. Mag. nat. Hist.* (8) **4**: 31–6.
- TANAKA, O. 1957. The pelagic copepods of the Izu region, middle Japan. Systematic account III. Family Aetideidae (Part I).—*Publs Seto mar. biol. Lab.* **6**: 31–68.
- WOLFENDEN, R. N. 1905. Notes on the collection of Copepoda. In: GARDINER, J. S. (ed.) *The Fauna and Geography of the Maldive and Laccadive Archipelagoes* **2**: suppl. 1: 989–1040. Cambridge: University Press; London: Clay.